MODIS Technical Team Meeting
Thursday, May 16, 2002
Building 33, Room E125

Vince Salomonson chaired the meeting. Present were Dorothy Hall, Gary Alcott, Bill Barnes, Jack Xiong, Wayne Esaias, Shaida Johnston, Robert Wolfe, Chris Justice, Eric Vermote, Chuck McClain, Robert Murphy, Bruce Ramsay, Michael King, and Yolanda Harvey, with David Herring taking the minutes.

1.0 Upcoming Meetings

- AGU, Spring, May 28-Jun 1, Washington, D.C.
- AMS, Atmospheric Radiation and Atmospheric Physics, first week of June, Odgen, Utah.
- MODIS Outreach Workshop on Land Cover Variables, June 3-4, University of Maryland, College Park.
- NPP Algorithm Technical Interchange Meeting on June 6
- IGARSS 2002, June 24-28, 2002 in Toronto (abstract deadline past)
- MODIS Outreach Workshop on MODIS Vegetation Variables (VI/LAI/FPAR/NPP), July 15-19th 2002, University of Montana, Missoula, MT
- MODIS Science Team Meeting, July 22-24, 2002, Greenbelt Marriott, MD
- Remote Sensing of the Earth's Environment from Terra, a workshop at the International Summer School on Atmospheric and Oceanic Sciences, August 25-30, 2002, L'Aquila Italy
- 34TH COSPAR Scientific Assembly, October 10-19, 2002, in Houston, TX, (abstract deadline past)
- MODIS Outreach Workshop on Land Surface Radiation Products, October 24-25, 2002, Boston

2.0 Meeting Minutes

2.1 Instrument Status

Justice said at the upcoming MODIS Science Team Meeting there should be a talk about the MODIS instrument status. In particular, he would like a top-level summary that address issues for both Terra and Aqua MODIS. Barnes said this is discussed at the weekly MCST meetings, of which there are minutes taken. Barnes suggested routinely forwarding those minutes to Yolanda Harvey, who can then distribute them to the team. Salomonson added that he would also attempt to address issues for both instruments in the Tech Team Meetings.

Barnes reported that Terra MODIS is doing fine. Mission ops loaded the formatter patches into the EEPROM s and they are working fine. There are no major issues to report.

Regarding Aqua MODIS, the next event on the post-launch milestone schedule is to outgas the radiative cooler starting Sunday, May 19. Salomonson asked

whether this would warm the internal cavity, and Barnes replied that no, it would warm mainly the cooler. The objective is to drive water vapor out of the instrument and to prevent frost from accumulating on the cooler walls. Barnes said there is a minor clock problem on the spacecraft—one of the spacecraft's clocks was found to be drifting 15 milliseconds per day. This may be the cause of several MODIS command processor errors.

Salomonson asked if the EOS Aqua Project Office is aware of the things the MODIS Team is concerned about, such as the response versus scan angle (RVS) problem as well as the problem of dead detectors. Barnes responded affirmatively; Ken Anderson has briefed the Project Office on these issues.

Salomonson announced that the Aqua Project Office requested a status report on the Aqua MODIS instrument as soon as possible. Specifically, the Project wants some indication as to whether the team expects Aqua MODIS to meet the team's science objectives. Salomonson said it will probably take the team a month or two, at least, to be able to answer that question. Barnes said Claire Parkinson, Aqua Project Scientist, relayed this message to the Project Office.

2.2 GES DAAC Reports

Regarding the flow of Aqua data, Gary Alcott reported that the ephemeris and attitude data are flowing nicely. He said there has been some trouble with L1 processing for one of Aqua's instruments, but he hopes that once the data start flowing such errors will be old hat. Overall, the Mission Ops has advanced ahead of the original schedule for turning everything on, and data are now flowing from all of Aqua's instruments. According to Alcott, the DAAC is seeing data from all APIDs from which they expected to see data. They have been working through a number of little glitches in processing and things are now going smoothly.

Regarding Terra MODIS data, the GES DAAC is on the leading edge of data flow; things are going smoothly there as well. In testing, the processing flow was moving a little slower than hoped for. There were some minor archive problems, but from system statistics available last night, the DAAC is showing a solid 6X production flow. Alcott said that as the load drops on weekends the DAAC is going to try to push extra hard on the weekends to account for any slowdowns during the week, thereby keeping their average production rate up.

2.3 SDST Reports

According to Wolfe, MODAPS is currently running only two days behind the leading edge of where the GES DAAC is in processing Terra MODIS data. He said the data flow is going fine. They now have in hand the hardware needed to run the test string and SDST hopes to install this new system quickly and have it online at the planned start date of Atmosphere processing tests. Wolfe said the second Oceans science test is now mostly completed, except for the sea surface temperature product.

Esaias added that part of the second test had to be redone. That test is all done now, except for the weekly products. Wolfe confirmed that SDST was aware of

data flow issue into MODAPS. SDST is doing another test now to ensure that it can process the Ocean products at the full rate and will process two 8-day periods as part of that test.

Wolfe reported that Collection 4 reprocessing is on schedule. The science test for the Atmosphere products starts June 1. SDST is in good shape on the Atmosphere science code deliveries and SDST should complete the test in five days. On June 6, SDST will start the Land science test. SDST doesn't have all the necessary code in hand for that. Wolfe expects most code deliveries to be made by Monday. Some of the code from the University of Arizona and the Level 2G code have yet to be delivered.

Johnston asked if there will be a change to PGE03 and, if so, doesn't it make sense to move this test? She questioned the logic of doing the test and then changing the algorithm. Wolfe responded that it depends upon when the delivery is scheduled. The delivery may not be in until late June and since that is an end product, it may be better to go ahead with the first test. He added that since the GES DAAC is hoping to start processing Collection 4 sometime in mid-August or early September, it would be good to get some lead-time. He is not sure of the impact of not running PGE03 along PGE01 and PGE02. So SDST may push out that start date.

Regarding the Geolocation product, Salomonson asked when the team would declare it validated. Should we say from April 2000 forward? Wolfe said yes, anything in Collection 3 is validated from April 2000 forward. March 2000 data are probably okay, but SDST hasn't had a chance to look at those data yet. The MOD01 and MOD02 products are considered validated from November 2000 and forward. Salomonson asked Yolanda Harvey to check the MODIS Products Web page to make sure it reports that the MOD03 product is described as validated from November 2000 forward.

2.4 Aqua MODIS First Light

Salomonson said there is ongoing discussion with NASA HQ on the plans for releasing first light images from the Aqua mission. He asked if the plan is to get the data down and process them into Collection 3 data and, when the team is comfortable with these data, move what should be kept from the public into Collection 199, and make everything else in Collection 3 visible to the public. Johnston said early Aqua data would remain "hidden" to the external community until the MODIS Team feels it is ready to make them visible. Therefore, they will still be processed like Collection 3, but the team can say they are validated past a certain date.

Barnes asked where the Team would like to first open the nadir aperture door to collect first light? Salomonson said he would like to produce a poster of the first light image like what the team did for Terra MODIS. This time, the image will be slanted from the southeast toward the northwest, so perhaps the image should span from Florida up toward the Great Lakes. Or, the image could start farther west, perhaps from over the Gulf of Mexico and northward over the U.S. Justice suggested not just producing an image of the U.S. East Coast. Rather, he felt we

should do produce a poster with both Terra and Aqua MODIS images of the same area side by side. This would show that both instruments are working. Esaias expressed concern that there may appear to be deficiencies in the Aqua MODIS image as compared to Terra MODIS, and these deficiencies may become obvious if the two are published side by side.

2.5 Land Group Reports

Justice said MODLAND is moving ahead with its plans to conduct Outreach Workshops in June. The planning is going well and it appears attendance will be good. There will be three categories (or themes) addressed in the workshops: (1) Radiation budget [i.e., bi-directional reflectance distribution function (BRDF), albedo, snow cover, land surface temperature, surface reflectance, and fraction of photosynthetically active radiation (FPAR)]; (2) Vegetation parameters (i.e., vegetation indices, leaf area index); and (3) Land surface changes (i.e., land use/land cover change, fires).

Salomonson said he visited Los Alamos and saw a presentation on a fire behavior model they have that takes into account topography, meteorology, etc. He said they were interested in incorporating the MODIS fire product into that model. Justice reported that the Monterey Naval Group is using MODIS Rapid Response fire data for emissions modeling. Justice gave a presentation to Al Condes at NASA HQ on the international use of MODIS Rapid Response data. There is some potential for international partners to begin using MODIS data more extensively. Salomonson added that some of the Atmosphere Group members (Yoram Kaufman, et al.) went to Beijing to meet with scientists doing aerosol studies there. Kaufman has noted that China uses MODIS direct broadcast data in a sophisticated way. Justice added that people are starting to use MODIS software and direct broadcast to produce fire products as well.

2.6 Sample MODIS Data Products on CD

Salomonson asked about the status of the CD being produced with a suite of MODIS global data products. Vermote said the data sets are almost finished, except for three products he has been struggling with—snow, leaf area index (LAI/FPAR), and the vegetation indices (VI/EVI). He expects to have all the data sets ready by the end of May. Salomonson said that he is working on a letter summarizing the products on the CD.

2.7 Ocean Group Reports

Esaias said the Ocean Group is concentrating on getting its code ready for reprocessing. When conducting the Science Test, the group found differences between the data processed at Goddard and at the University of Miami. They found differences in the formats of ancillary products with PGEs that were written here at Goddard. He said these products will be rewritten at Goddard, will take up to a week to do, and that this might impact the reprocessing schedule. Esaias has set up a teleconference to between Goddard and the University of Miami to discuss the problem and define roles in resolving it. He noted that none of this affects the validation work Miami has done with the

Marine Optical Buoy (MOBY). All that work is still valid, as is the mirror side effects and detector effects work. He said when the group could get winds and ozone data, then it would be ready to begin reprocessing.

Esaias reported that the MODIS Ocean Group members at Oregon State are working with the Goddard Education Office and the Jason Project to support the upcoming (January 2003) expedition to the Channel Islands off California. The objective is to make available near-real-time MODIS data coincident with students' *in situ* measurements for comparison. According to the Jason Project, roughly 300,000 middle school teachers worldwide will participate in this program.

2.8 NOAA

Regarding the NOAA Coast Watch program, Bruce Ramsay said NOAA is taking advantage of the MODIS ocean color and sea surface temperature data. He reported that NOAA has made great strides on developing a nice Coast Watch Web site that features, in part, MODIS data (<http://coastwatch.noaa.gov:8081/cw_dataprod.html>; check with Kent Hughes (Kent.Hughes@noaa.gov), NOAA/NESDIS/ORA, for the username and password). Already there are a number of customers anxious to use it; e.g., a NOAA Marine Fisheries Lab in Hawaii is planning a cruise in the Central Pacific. That Lab plans to use MODIS chlorophyll data to track surface species of phytoplankton. The Lab is also using SeaWiFS data.

Ramsay said there are some differences in the MODIS data processed by the GES DAAC and the data processed by NESDIS in near real time.

Esaias said the Ocean Group has not yet paid a lot of attention to the validation of Collection 4 data in the forward processing stream. He said there is a need to incorporate new radcor calibration files that were used in the Science Test 1—Version 12.2. There have been many tweaks along the way and the Group plans to go into production with Version 12.56. That should be a simple change to make, but he noted the bent pipe also uses the MODAPS ancillary data files and there are format problems there. Esaias said this is not a big effort and shouldn't delay things. He is excited about Coast Watch using MODIS data.

Regarding MODIS code availability, the Group is still waiting on a review to be completed by the Goddard Chief Counsel. NASA is still not permitted to distribute the MODIS code freely until the patent counsel approves.

2.9 Issue on Software Versions

Now that the team has resolved the issues at the level of data collections, Johnston said the next issue that needs addressing is the versioning of production software. An agreement was made a few weeks ago on this subject, but she feels that it needs clarification. She suggested that each discipline group could keep a table that states clearly the Terra and Aqua product changes. Salomonson acknowledged that the external user community has been "underwhelmed" by the complexity of the many versions of MODIS data products. He encouraged the team to keep such a table as simple as possible.

He explained that as the team moves forward in processing Collection 3, nominally it would have frozen the production code, but that hasn't been the case. All of the disciplines continued advocating making changes to improve products as we go forward processing Collection 3. Johnston said she hopes there will soon be a time when we can get to a more streamlined process, so that the team can schedule some interim releases in a more methodical fashion. Esaias recognized that continually making code changes during the processing of Collection 3 and/or Collection 4 ensures that some members of the general science community won't use these data collections because they may consider them to be inconsistent data sets.

Salomonson said the current plan for Collection 4 is to process the current 2-year collection of all MODIS data over the next 1.25 years, starting in October. But he anticipates there will be changes in the code along the way. Johnston urged the team to consider collecting all of the code changes that are coming in now but not implement them until October. She hopes to establish a mechanism to track changes to products that have dependencies downstream, so upstream code changes don't adversely impact downstream products.

2.10 NPP Status Update

Murphy said he gave briefing on NPP to the National Academy of Sciences on the plans for conversion of that project to an operational status. The NPP spacecraft selection is now down to two competing contractors and that decision now lies in the hands of Ghassem Asrar. In the meantime, NPOES is preparing its total shared performance responsibility (TSPR) contract. Again, this selection is now between two competing contractors. Murphy said the NPP Project will next have to select the preferred mission design for the VIIRS instrument—again, there will be two competing design concepts.

He announced that an Algorithm Technical Interchange Meeting will be held on June 6, and that there will be a number of MODIS team members involved in the algorithm review. On June 7, the review team will discuss sea surface temperature. Murphy said there is some conflict between whether VIIRS should collect bulk or skin temperature measurements. Murphy hopes to have Peter Minnett attend that discussion. Regarding atmospheric science, Murphy said David Schimel is on the VIIRS Advisory Team and Paul Menzel is the Discipline Group Leader.

Murphy reported that the VIIRS Critical Design Review was held in March. Overall, he said, it went well. There were number of concerns expressed about the Level 1 algorithm. Currently, VIIRS is in very bad shape on that. Otherwise, the project is on budget and on schedule. For testing the VIIRS system, the plan is to use real MODIS data and synthetic data. He expects the VIIRS NASA Research Announcement to be released in late June 2002. Justice said he is concerned that there are many NRAs planned for release in June, which can make it challenging to respond to each of them.

3.0 Action Items

3.1 New Action Items

3.1.1 Yolanda Harvey to update the MODIS Web site's product page to indicate that MOD03 is validated from November 2000 and forward.

3.2 Action Items Carried Forward

3.2.1 Discipline leads to meet to resolve the issue of beta-release code and science-quality code, and what we need to say about it.
Status: Closed

3.2.2 Technical team to discuss further the issue of predicted ephemeris data and how to improve it.
Status: Open.
Ed Masuoka and Wolfe plan to meet with the Terra Flight Operations Team to see if they can run definitive ephemeris 2-4 times per day. The context for this issue to provide better geolocation information for things like fire front tracking and similar issues.

3.2.3 The procedure for releasing Aqua MODIS products needs to be further refined via Discipline discussions and coordination with the Science Team leader, et al.
Status: Open.

3.2.4 Diane Wickland and Martha Maiden should be informed that MODAPS and the DAAC have updated their capabilities.
Status: Open.